SEQUENCE LISTING

<110> Hannapel, David J.
Chen, Hao
Rosin, Faye M.

<120> POTATO TRANSCRIPTION FACTORS, METHODS OF USE THEREOF, AND A METHOD FOR ENHANCING TUBER DEVELOPMENT

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<140> 10/624,201
<141> 2003-07-21

<150> 60/397,423
<151> 2002-07-19

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<170> PatentIn Ver. 2.1

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Asp Thr Gln Gln Gln Gln Gln Leu Leu Phe Leu Asn Ser Ser Pro Ala
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Ser Cys Gly Gly Ile Thr Thr Asp Leu Ala Ser Gln Leu Ala Phe Gln
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Arg Gly Thr Leu Asp Gly Ser Ser Ser Asn Met Val Leu Gly Ser Lys
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Gly Lys Ser Ile Lys Gly Asp Asp Gln Lys Lys Asp Asn Ser Met Asn
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Gly Gly Glu Ser Ser Ser Arg Gln Lys Asn Glu Val Ala Val Glu Leu
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Thr Thr Ala Gln Arg Gln Glu Leu Gln Met Lys Lys Ala Lys Leu Leu
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Ala Met Leu Glu Glu Val Glu Gln Arg Tyr Arg Gln Tyr His His Gln
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Ile Gly Met Met Gln Pro Asn Ala Trp Arg Pro Gln Arg Gly Leu Pro
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Glu Arg Ala Val Ser Val Leu Arg Ala Trp Leu Phe Glu His Phe Leu
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His Pro Tyr Pro Lys Asp Ser Asp Lys Ile Met Leu Ala Lys Gln Thr
            420                 425                 430

Gly Leu Thr Arg Ser Gln Val Ser Asn Trp Phe Ile Asn Ala Arg Val
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Glu Thr Asn Ile Ser Ala Pro Asn Glu Glu Lys His Pro Ile Ile Thr
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Ser Ser Leu Leu Gln Asp Gly Ile Thr Thr Thr Gln Ala Glu Ile Ser
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Ala His Asn Phe Ser Phe Leu Gly Ser Phe Asn Met Asp Asn Thr Thr
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Thr Thr Val Asp His Ile Glu Asn Asn Ala Lys Lys Gln Arg Asn Asp
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Met His Lys Phe Ser Pro Ser Ser Ile Leu Ser Ser Val Asp Met Glu
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Gly Leu Pro Pro Ser Glu Asn Leu Ala Met Pro Val Ser Gln Gln Asn
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Tyr Leu Ser Asn Asp Leu Gly Ser Arg Ser Glu Met Gly Ser His Tyr
                645                 650                 655

Asn Arg Met Gly Tyr Glu Asn Ile Asp Phe Gln Ser Gly Asn Lys Arg
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Gly Thr Asn Thr Asn Asn Ile Asn His Thr Arg Gly Leu Gly Ala Ser
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Ser Ser Phe Ser Ile Ser Asn Gly Met Ile Leu Gly Ser Lys Tyr Leu
     50                  55                  60

Lys Val Ala Gln Asp Leu Leu Asp Glu Val Val Asn Val Gly Lys Asn
 65                  70                  75                  80

Ile Lys Leu Ser Asp Gly Leu Glu Ser Gly Ala Lys Glu Lys His Lys
                 85                  90                  95

Leu Asp Asn Glu Leu Ile Ser Leu Ala Ser Asp Asp Val Glu Ser Ser
            100                 105                 110

Ser Gln Lys Asn Ser Gly Val Glu Leu Thr Thr Ala Gln Arg Gln Glu
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Leu Gln Met Lys Lys Ala Lys Leu Val Ser Met Leu Asp Glu Val Asp
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Gln Arg Tyr Arg Gln Tyr His His Gln Met Gln Met Ile Ala Thr Ser
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Ser Gly Gln Ile Lys Asp Thr Ser Lys Thr Leu Gly Glu Glu Glu Asn
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Ile Gly Gly Lys Ile Glu Gly Ser Lys Leu Lys Phe Val Asp His His
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Arg Ala Trp Leu Phe Glu His Phe Leu His Pro Tyr Pro Lys Asp Ser
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Ser Asn Trp Phe Ile Asn Ala Arg Val Arg Leu Trp Lys Pro Met Val
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Ser Leu Thr Leu Gly Leu Pro Pro Asn Ser Glu Asn Gln His Asn Tyr
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Ile Gly Leu Glu Asn His Tyr Asn Gln Pro Thr His His Pro Asn Ile
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                165                 170                 175

Gly Val Val Asn Val Leu Arg Asn Ser Lys Tyr Ala Lys Ala Ala Gln
            180                 185                 190

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Thr Asn Asn Lys Ala Ala Ala Asn Asn Pro Asn Thr Asn Pro Ser Gly
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Asp Arg Ile Glu His Gln Arg Arg Lys Val Lys Leu Leu Ser Met Val
                245                 250                 255

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Val Val Asn Ser Phe Asp Leu Val Met Gly Phe Gly Thr Ala Val Pro
        275                 280                 285

Tyr Thr Ala Leu Ala Gln Lys Ala Met Ser Arg His Phe Arg Cys Leu
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Lys Asp Ala Ile Gly Ala Gln Leu Lys Gln Ser Cys Glu Leu Leu Gly
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Leu Lys Met Leu Glu Gln Ser Leu Arg Gln Gln Arg Ala Phe His Gln
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Gly Leu Ser Arg Asn Gln Val Ser Asn Trp Phe Ile Asn Ala Arg Val
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Arg Leu Trp Lys Pro Met Val Glu Asp Met Tyr Gln Gln Glu Ala Lys
            420                 425                 430

Asp Glu Asp Gly Asp Gly Asp Glu Lys Ser Gln Ser Gln Asn Ser Gly
        435                 440                 445

Asn Asn Ile Ile Ala Gln Thr Pro Thr Pro Asn Ser Leu Thr Asn Thr
    450                 455                 460

Ser Ser Thr Asn Met Thr Thr Thr Thr Ala Pro Thr Thr Thr Thr Ala
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Leu Ala Ala Ala Glu Thr Gly Thr Ala Ala Thr Pro Ile Thr Val Thr
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Ser Ser Lys Arg Ser Gln Ile Asn Ala Thr Asp Ser Asp Pro Ser Leu
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Val Ala Ile Asn Ser Phe Ser Glu Asn Gln Ala Thr Phe Pro Thr Asn
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Ile His Asp Pro Asp Asp Cys Arg Arg Gly Asn Leu Ser Gly Asp Asp
    530                 535                 540

Gly Thr Thr Thr His Asp His Met Gly Ser Thr Met Ile Arg Phe Gly
545                 550                 555                 560

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<223> N at position 1862 is a, c, t, or g

<220>
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<222> (1911)
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<222> (1926)
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<222> (1932)
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<222> (1960)

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<222> (2036)
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<220>
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<222> (2039)
<223> N at position 2039 is a, c, t, or g

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<220>
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<222> (2049)
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<221> unsure
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<222> (2076)
<223> N at position 2076 is a, c, t, or g

<220>
<221> unsure
<222> (2091)
<223> N at position 2091 is a, c, t, or g

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gacatcaaga tttgcaacaa ggattaatac atgatggatt tttgggtaaa tctacaaata 360
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ctcaagagtt gctcagtgag ttctgtagtc tcggaataaa gaagaataat gatcattctt 480
cttcaaaagt acttctaaag caacatgaga gtactgctag tacttcaaaa aagcaacttt 540
tacagtctct tgacctttg gaacttcaaa aaagaaagac aaaattgctt caaatgcttg 600
aagaggtgga tagaaggtac aagcattatt gtgatcaaat gaaggctgtt gtatcatcat 660
ttgaagcagt ggctggaaat ggagcagcaa cagtttactc agccttagca tcaagggcta 720
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taattagagg tggagatcaa tcgtttggcg cgattgagct agatttttca acaaatattg 1380

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gattacaaca acatggtgga agtggtggat catcaatggg gttaactaca ttttcatcac 1500
aaccatctca taatcaaagt tcacttttt atccaagaga tgatgatcaa gttcaatatt 1560
catcactttt ggatagtgaa aatcagaatt tgccatatag aaaccttgat gggggcacaa 1620
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tnttnctgca nanatctntg aatcgtaaat nctgaaaaac cccgcaagtt cacttcaact 1860
gngcatcgng cnccatctca atttctttca tttatncatc gttttgcctt nttttatgta 1920
actatnctcc tntaagtttc aatcttggcc atgtaacctn tgatctntaa aatttttaa 1980
atgactanaa ttaatgccca tnttttttt ggacctaaat tnttcatgaa aatntnttnc 2040
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ggt 2103

<210> 8
<211> 589
<212> PRT
<213> Solanum tuberosum

<400> 8

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Asn	Leu	Ser	Ser	Thr	Thr	Ser	Ser	Met	Asp	Gln	Met	Ile	Gly	Phe	Pro
			20					25				30			
Pro	Asn	Asn	Asn	Asn	Pro	His	His	Val	Leu	Trp	Lys	Gly	Asn	Phe	Pro
		35					40					45			
Asn	Lys	Ile	Asn	Gly	Val	Asp	Asp	Asp	Asp	His	Gly	Pro	Ser	Ser	Ser
	50					55					60				
Lys	Asn	Ile	Ile	Ser	Glu	Gln	Phe	Tyr	Gln	His	Gly	Ser	His	Glu	Asn
65					70					75					80
Met	Leu	Thr	Thr	Thr	Thr	Thr	His	His	Asp	Asp	His	Gln	Gly	Ser	Trp
				85					90					95	
His	His	Asp	Asn	Asn	Arg	Thr	Leu	Leu	Val	Asp	Asp	Pro	Ser	Met	Arg
			100					105					110		
Cys	Val	Phe	Pro	Cys	Glu	Gly	Asn	Glu	Arg	Pro	Ser	His	Gly	Leu	Ser
		115					120					125			
Leu	Ser	Leu	Cys	Ser	Ser	Asn	Pro	Ser	Ser	Ile	Gly	Leu	Gln	Ser	Phe
	130					135					140				

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Glu Leu Arg His Gln Asp Leu Gln Gln Gly Leu Ile His Asp Gly Phe
145                 150                 155                 160

Leu Gly Lys Ser Thr Asn Ile Gln Gln Gly Tyr Phe His His His His
                165                 170                 175

Gln Val Arg Asp Ser Lys Tyr Leu Gly Pro Ala Gln Glu Leu Leu Ser
            180                 185                 190

Glu Phe Cys Ser Leu Gly Ile Lys Lys Asn Asn Asp His Ser Ser Ser
        195                 200                 205

Lys Val Leu Leu Lys Gln His Glu Ser Thr Ala Ser Thr Ser Lys Lys
    210                 215                 220

Gln Leu Leu Gln Ser Leu Asp Leu Leu Glu Leu Gln Lys Arg Lys Thr
225                 230                 235                 240

Lys Leu Leu Gln Met Leu Glu Glu Val Asp Arg Arg Tyr Lys His Tyr
                245                 250                 255

Cys Asp Gln Met Lys Ala Val Val Ser Ser Phe Glu Ala Val Ala Gly
            260                 265                 270

Asn Gly Ala Ala Thr Val Tyr Ser Ala Leu Ala Ser Arg Ala Met Ser
        275                 280                 285

Arg His Phe Arg Cys Leu Arg Asp Gly Ile Val Ala Gln Ile Lys Ala
    290                 295                 300

Thr Lys Met Ala Met Gly Glu Lys Asp Ser Thr Ser Thr Leu Ile Pro
305                 310                 315                 320

Gly Ser Thr Arg Gly Glu Thr Pro Arg Leu Arg Leu Leu Asp Gln Thr
                325                 330                 335

Leu Arg Gln Gln Lys Ala Phe Gln Gln Met Asn Met Met Glu Thr His
            340                 345                 350

Pro Trp Arg Pro Gln Arg Gly Leu Pro Glu Arg Ser Val Ser Val Leu
        355                 360                 365

Arg Ala Trp Leu Phe Glu His Phe Leu His Pro Tyr Pro Ser Asp Val
    370                 375                 380

Asp Lys His Ile Leu Ala Arg Gln Thr Gly Leu Ser Arg Ser Gln Val
385                 390                 395                 400
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Ser Asn Trp Phe Ile Asn Ala Arg Val Arg Leu Trp Lys Pro Met Val
405 410 415

Glu Glu Met Tyr Leu Glu Glu Thr Lys Glu Glu Glu Asn Val Gly Ser
420 425 430

Pro Asp Gly Ser Lys Ala Leu Ile Asp Asp Met Thr Ile His Gln Ser
435 440 445

His Ile Asp His His Gln Ala Asp Gln Lys Pro Asn Leu Val Arg Ile
450 455 460

Asp Ser Glu Cys Ile Ser Ser Ile Ile Asn His Gln Pro His Glu Lys
465 470 475 480

Asn Asp Gln Asn Tyr Gly Val Ile Arg Gly Gly Asp Gln Ser Phe Gly
485 490 495

Ala Ile Glu Leu Asp Phe Ser Thr Asn Ile Ala Tyr Gly Thr Ser Gly
500 505 510

Gly Asp His His His His Gly Gly Gly Val Ser Leu Thr Leu Gly Leu
515 520 525

Gln Gln His Gly Gly Ser Gly Gly Ser Ser Met Gly Leu Thr Thr Phe
530 535 540

Ser Ser Gln Pro Ser His Asn Gln Ser Ser Leu Phe Tyr Pro Arg Asp
545 550 555 560

Asp Asp Gln Val Gln Tyr Ser Ser Leu Leu Asp Ser Glu Asn Gln Asn
565 570 575

Leu Pro Tyr Arg Asn Leu Asp Gly Gly Thr Thr Ser Ser
580 585

<210> 9
<211> 1939
<212> DNA
<213> Solanum tuberosum

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cagccacatc atcaacctcc gaccagggag tggtttggta acagacaaga gatcgtagtt 180
ggtggaagtt tgcaggtaac atttggggat acaaaagatg atgtgaatgc gaaggtatta 240
ttgagtaacc gtgatagtgt aactgattat tatcagcgtc aacacaatca agtaccaagt 300

ataaataccg cggagtccat gcaacttttt cttatgaatc cacaaccaag ttcaccatca 360
caatctactc cttcaactct tcatcaaggg ttttctagcc cggtcggagg gcattttagt 420
caattcatgt gtggaggagc aagtacttct tcaaatccaa ttggaggagt aaatgtgatt 480
gatcaagggc aaggtctttc attgtccttg tcatctactt tacaacattt ggaagcatcc 540
aaagtggaag atttgaggat gaatagtgga ggagaaatgt tgtttttcaa tcaagaaagt 600
caaaatcatc ataatattgg ttttgggtca tcactaggac tagtcaatgt gttgaggaat 660
tcaaagtatg tcaaagcaac acaagagttg ttggaagagt tttgttgtgt tgggaagggt 720
caattgttca agaaaatcaa caaagtttct aggaataaca acacaagtac atcacccatt 780
attaacccta gtggaagtaa taacaataat tcatcttctt caaaggctat tatccctcct 840
aatttgtcaa ctgcagagag acttgatcat caaagaagga aggtcaaact tttatccatg 900
cttgatgagg tagagaaaag atacaaccac tattgtgaac aaatgcagat ggtagtaaac 960
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gatgttgatg acatgcaaga aaaccaaaac agtacaaata cacaaatacc aacgcctaat 1500
attattatta caaccaattc taacattaca gaaacaaaat cagctgccac tgccacaatt 1560
gcttcagaca aaaaacccca aatcaatgtc tctgaaattg acccttcaat tgtcgcaatg 1620
aatacacatt attcttcctc tatgccaact caattaacca atttccccac tattcaagat 1680
gagtccgacc acatcttata tcgccgcagt ggagcggaat atgggaccac aaatatggct 1740
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tcacttacct taggactgcg ccatgcgggt aatttacctg agaatactca tttttccggt 1860
taattaagat agtgtattca aacactgcta cataaattat gattttatat atatatatat 1920
tgtcatccga ttagtttat 1939

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<211> 620
<212> PRT
<213> Solanum tuberosum

<400> 10
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20 25 30

Asn Asn Tyr Arg His Pro Asn Gln Gln Pro His His Gln Pro Pro Thr
35 40 45

Arg Glu Trp Phe Gly Asn Arg Gln Glu Ile Val Val Gly Gly Ser Leu
50 55 60

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Gln Val Thr Phe Gly Asp Thr Lys Asp Asp Val Asn Ala Lys Val Leu
 65                  70                  75                  80

Leu Ser Asn Arg Asp Ser Val Thr Asp Tyr Tyr Gln Arg Gln His Asn
                 85                  90                  95

Gln Val Pro Ser Ile Asn Thr Ala Glu Ser Met Gln Leu Phe Leu Met
            100                 105                 110

Asn Pro Gln Pro Ser Ser Pro Ser Gln Ser Thr Pro Ser Thr Leu His
        115                 120                 125

Gln Gly Phe Ser Ser Pro Val Gly Gly His Phe Ser Gln Phe Met Cys
    130                 135                 140

Gly Gly Ala Ser Thr Ser Ser Asn Pro Ile Gly Gly Val Asn Val Ile
145                 150                 155                 160

Asp Gln Gly Gln Gly Leu Ser Leu Ser Leu Ser Ser Thr Leu Gln His
                165                 170                 175

Leu Glu Ala Ser Lys Val Glu Asp Leu Arg Met Asn Ser Gly Gly Glu
            180                 185                 190

Met Leu Phe Phe Asn Gln Glu Ser Gln Asn His His Asn Ile Gly Phe
        195                 200                 205

Gly Ser Ser Leu Gly Leu Val Asn Val Leu Arg Asn Ser Lys Tyr Val
    210                 215                 220

Lys Ala Thr Gln Glu Leu Leu Glu Glu Phe Cys Cys Val Gly Lys Gly
225                 230                 235                 240

Gln Leu Phe Lys Lys Ile Asn Lys Val Ser Arg Asn Asn Asn Thr Ser
                245                 250                 255

Thr Ser Pro Ile Ile Asn Pro Ser Gly Ser Asn Asn Asn Asn Ser Ser
            260                 265                 270

Ser Ser Lys Ala Ile Ile Pro Pro Asn Leu Ser Thr Ala Glu Arg Leu
        275                 280                 285

Asp His Gln Arg Arg Lys Val Lys Leu Leu Ser Met Leu Asp Glu Val
    290                 295                 300

Glu Lys Arg Tyr Asn His Tyr Cys Glu Gln Met Gln Met Val Val Asn
305                 310                 315                 320
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Ser Phe Asp Leu Val Met Gly Phe Gly Ala Ala Val Pro Tyr Thr Ala
325 330 335

Leu Ala Gln Lys Ala Met Ser Arg His Phe Lys Cys Leu Lys Asp Gly
340 345 350

Val Ala Ala Gln Leu Lys Lys Thr Cys Glu Ala Leu Gly Glu Lys Asp
355 360 365

Ala Ser Ser Ser Ser Gly Leu Thr Lys Gly Glu Thr Pro Arg Leu Lys
370 375 380

Val Leu Glu Gln Ser Leu Arg Gln Gln Arg Ala Phe Gln Gln Met Gly
385 390 395 400

Met Met Glu Gln Glu Ala Trp Arg Pro Gln Arg Gly Leu Pro Glu Arg
405 410 415

Ser Val Asn Ile Leu Arg Ala Trp Leu Phe Glu His Phe Leu His Pro
420 425 430

Tyr Pro Ser Asp Ala Asp Lys His Leu Leu Ala Arg Gln Thr Gly Leu
435 440 445

Ser Arg Asn Gln Val Ala Asn Trp Phe Ile Asn Ala Arg Val Arg Leu
450 455 460

Trp Lys Pro Met Val Glu Glu Met Tyr Gln Arg Glu Val Asn Glu Asp
465 470 475 480

Asp Val Asp Asp Met Gln Glu Asn Gln Asn Ser Thr Asn Thr Gln Ile
485 490 495

Pro Thr Pro Asn Ile Ile Ile Thr Thr Asn Ser Asn Ile Thr Glu Thr
500 505 510

Lys Ser Ala Ala Thr Ala Thr Ile Ala Ser Asp Lys Lys Pro Gln Ile
515 520 525

Asn Val Ser Glu Ile Asp Pro Ser Ile Val Ala Met Asn Thr His Tyr
530 535 540

Ser Ser Ser Met Pro Thr Gln Leu Thr Asn Phe Pro Thr Ile Gln Asp
545 550 555 560

Glu Ser Asp His Ile Leu Tyr Arg Arg Ser Gly Ala Glu Tyr Gly Thr
565 570 575

Thr Asn Met Ala Ser Asn Ser Glu Ile Gly Ser Asn Met Ile Thr Phe
580 585 590

Gly Thr Thr Thr Ala Ser Asp Val Ser Leu Thr Leu Gly Leu Arg His
595 600 605

Ala Gly Asn Leu Pro Glu Asn Thr His Phe Ser Gly
610 615 620

<210> 11
<211> 2128
<212> DNA
<213> Solanum tuberosum

<220>
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<223> N at position 2078 is a, c, t, or g

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caacagcaac aacagagtat tagtagtgtg cctttgagtt ctaagtacat gaaggctgca 180
caagagctac ttgatgaagt tgtaaatgtt ggaaaatcaa tgaaaagtac taatagtact 240
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gaagatagtt tgggagggaa gattgaaggt tcaaggctta aatttgttga taatcagcta 660
agacagcaaa gggctttgca acaattggga atgatccagc ataatgcttg gagacctcag 720
agaggattgc ccgaacgagc tgtttctgtt cttcgcgctt ggctttttga acatttcctc 780
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cctcaacaca accctgcttc accaatgccc gatgtccaac gccacttcca taccctatc 1140
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ccaaacagca ttccatccat caacatggat gtaaagccta acgaggaaca aatgtcgatg 1320
aagtttggtg atgataggca ggacagagat ggattctcac taatgggagg accgatgaac 1380
ttcatgggag gattcggagc ctatcccatt ggagaaattg ctcggtttag caccgagcaa 1440
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gaaaacctct caatgtctgc aacacaccac agtttccttc caattccaac acaaaacatc 1560
caaattggaa gtgaaccaaa tcatgagttt ggtagcttaa acacaccaac atcagctcac 1620

tcaacatcaa gcgtctatga aaccttcaac attcagaaca gaaagaggtt cgccgcaccc 1680
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<210> 12
<211> 567
<212> PRT
<213> Solanum tuberosum

<400> 12

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Asn Phe Thr Ala Ala Arg Glu Leu Val Ser Ser Pro Ser Gly Ser Ala
20 25 30

Ser Ala Ser Gly Ile Gln Gln Gln Gln Gln Gln Gln Ser Ile Ser
35 40 45

Ser Val Pro Leu Ser Ser Lys Tyr Met Lys Ala Ala Gln Glu Leu Leu
50 55 60

Asp Glu Val Val Asn Val Gly Lys Ser Met Lys Ser Thr Asn Ser Thr
65 70 75 80

Asp Val Val Val Asn Asn Asp Val Lys Lys Ser Lys Asn Met Gly Asp
85 90 95

Met Asp Gly Gln Leu Asp Gly Val Gly Ala Asp Lys Asp Gly Ala Pro
100 105 110

Thr Thr Glu Leu Ser Thr Gly Glu Arg Gln Glu Ile Gln Met Lys Lys
115 120 125

Ala Lys Leu Val Asn Met Leu Asp Glu Val Glu Gln Arg Tyr Arg His
130 135 140

Tyr His His Gln Met Gln Ser Val Ile His Trp Leu Glu Gln Ala Ala
145 150 155 160

Gly Ile Gly Ser Ala Lys Thr Tyr Thr Ala Leu Ala Leu Gln Thr Ile

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                165                 170                 175

Ser Lys Gln Phe Arg Cys Leu Lys Asp Ala Ile Ile Gly Gln Ile Arg
            180                 185                 190

Ser Ala Ser Gln Thr Leu Gly Glu Glu Asp Ser Leu Gly Gly Lys Ile
        195                 200                 205

Glu Gly Ser Arg Leu Lys Phe Val Asp Asn Gln Leu Arg Gln Gln Arg
    210                 215                 220

Ala Leu Gln Gln Leu Gly Met Ile Gln His Asn Ala Trp Arg Pro Gln
225                 230                 235                 240

Arg Gly Leu Pro Glu Arg Ala Val Ser Val Leu Arg Ala Trp Leu Phe
                245                 250                 255

Glu His Phe Leu His Pro Tyr Pro Lys Asp Ser Asp Lys Met Met Leu
            260                 265                 270

Ala Lys Gln Thr Gly Leu Thr Arg Ser Gln Val Ser Asn Trp Phe Ile
        275                 280                 285

Asn Ala Arg Val Arg Leu Trp Lys Pro Met Val Glu Glu Met Tyr Leu
    290                 295                 300

Glu Glu Ile Lys Glu His Glu Gln Asn Gly Leu Gly Gln Glu Lys Thr
305                 310                 315                 320

Ser Lys Leu Gly Glu Gln Asn Glu Asp Ser Thr Thr Ser Arg Ser Ile
                325                 330                 335

Ala Thr Gln Asp Lys Ser Pro Gly Ser Asp Ser Gln Asn Lys Ser Phe
            340                 345                 350

Val Ser Lys Gln Asp Asn His Leu Pro Gln His Asn Pro Ala Ser Pro
        355                 360                 365

Met Pro Asp Val Gln Arg His Phe His Thr Pro Ile Gly Met Thr Ile
    370                 375                 380

Arg Asn Gln Ser Ala Gly Phe Asn Leu Ile Gly Ser Pro Glu Ile Glu
385                 390                 395                 400

Ser Ile Asn Ile Thr Gln Gly Ser Pro Lys Lys Pro Arg Asn Asn Glu
                405                 410                 415

Met Leu His Ser Pro Asn Ser Ile Pro Ser Ile Asn Met Asp Val Lys
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420 425 430

Pro Asn Glu Glu Gln Met Ser Met Lys Phe Gly Asp Asp Arg Gln Asp
435 440 445

Arg Asp Gly Phe Ser Leu Met Gly Gly Pro Met Asn Phe Met Gly Gly
450 455 460

Phe Gly Ala Tyr Pro Ile Gly Glu Ile Ala Arg Phe Ser Thr Glu Gln
465 470 475 480

Phe Ser Ala Pro Tyr Ser Thr Ser Gly Thr Val Ser Leu Thr Leu Gly
485 490 495

Leu Pro His Asn Glu Asn Leu Ser Met Ser Ala Thr His His Ser Phe
500 505 510

Leu Pro Ile Pro Thr Gln Asn Ile Gln Ile Gly Ser Glu Pro Asn His
515 520 525

Glu Phe Gly Ser Leu Asn Thr Pro Thr Ser Ala His Ser Thr Ser Ser
530 535 540

Val Tyr Glu Thr Phe Asn Ile Gln Asn Arg Lys Arg Phe Ala Ala Pro
545 550 555 560

Leu Leu Pro Asp Phe Val Ala
565

<210> 13
<211> 2065
<212> DNA
<213> Solanum tuberosum

<400> 13
atctccaagt aaaaaggtta ttgagaaaag taacacagat ggcgacttat tttcctagtc 60
caaacaatca aagagatgct gatcagacat ttcaatattt taggcaatct ttgcctgagt 120
cttattcaga agcttcaaat gctccagaaa acatgatggt attcatgaac tattcttctt 180
ctggggcata ttcagatatg ttgacgggta cttcccaaca acaacacaac tgcatcgata 240
tcccatctat aggagccacg cctttcaaca catcccaaca agaaatattg tcaaatcttg 300
gaggatcgca gatggggatt caggattttt cttcatggag agatagcaga aatgagatgc 360
tagctgataa tgtctttcaa gttgcacaaa atgtgcaggg tcaaggatta tccctcagtc 420
ttggctccaa tataccatct ggaattggaa tttcacatgt ccaatctcag aatcctaacc 480
aaggtggcgg ttttaacatg tcctttggag atggtgataa ttcccaacca aaagaacaaa 540
gaaatgcaga ttattttcct ccggataatc ctggaaggga cttggatgct atgaaagggt 600
ataattctcc atatggtacg tcgagtattg caaggaccat tcccagctcg aagtatttga 660
aagcagctca atatttgctt gatgaggttg ttagtgtcag aaaggccatc aaggagcaaa 720

attctaagaa agagttgaca aaggattcca gagagtctga tgtggactcg aaaaatatat 780
catcagatac tcctgcaaat gggggttcaa atcctcatga gtccaaaaac aaccaaagtg 840
aactttcacc taccgagaag caagaagtgc agaacaaact ggccaaactt ctgtcaatgc 900
tggatgagat tgatagaagg tacagacaat attatcatca gatgcaaata gtggtttcat 960
catttgatgt ggtagctgga gaaggagcag ctaaaccata cacagctctt gctctccaga 1020
caatttcccg acacttccgt tgcttgcgtg atgcaatctg cgatcagatt cgagcatcac 1080
gaagaagtct tggagagcaa gatgcttcag aaaacagcaa agcgattgga atatcacgcc 1140
tgcgttttgt ggatcatcat attagacagc agagagccct gcagcagctt ggtatgatgc 1200
aacaacatgc ctggaggcct cagaggggat tgcctgaaag ctctgtttca gttttgcgtg 1260
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caaggcaaac tggcttaacg agaagtcagg tatcaaattg gttcataaat gcacgggtgc 1380
gtctttggaa acccatggtt gaggaaatgt acaaagaaga ggctggtgat gctaaaatag 1440
actcaaattc ttcatcggat gttgccccca gacttgcaac aaaagactca aaagttgaag 1500
aaagaggaga attgcaccag aatgcagctt cagaatttga gcagtacaat agtggccaaa 1560
tcctggagtc aaaatctaac catgaagctg atgtagaaat ggagggagca agtaatgcag 1620
aaactcaaag tcaatctgga atggaaaacc aaacaggcga acccctgcct gctatggata 1680
attgcaccct ttttcaggac gcatttgttc aaagcaacga tagattctca gaatttggta 1740
gttttggaag tggaaatgta ctacccaatg gagtttcact tacattgggg ctgcagcaag 1800
gtgaaggaag caacctacct atgtccatcg aaactcacgt tagttatgta ccattaaggg 1860
cagatgacat gtatagtaca gcacctacta ctatggtccc tgaaacagca gaattcaact 1920
gcttggattc tgggaatagg cagcaaccat tttggctcct accatctgct acatgatttt 1980
gtatgtgttg tagaattaaa ctgcaagttt tgagtacatc aacattcatc ttcaaaaaaa 2040
aaaaaaaaaa aaaaaaaaaa aaaaa 2065

<210> 14
<211> 645
<212> PRT
<213> Solanum tuberosum

<400> 14
Met Ala Thr Tyr Phe Pro Ser Pro Asn Asn Gln Arg Asp Ala Asp Gln
1 5 10 15

Thr Phe Gln Tyr Phe Arg Gln Ser Leu Pro Glu Ser Tyr Ser Glu Ala
20 25 30

Ser Asn Ala Pro Glu Asn Met Met Val Phe Met Asn Tyr Ser Ser Ser
35 40 45

Gly Ala Tyr Ser Asp Met Leu Thr Gly Thr Ser Gln Gln Gln His Asn
50 55 60

Cys Ile Asp Ile Pro Ser Ile Gly Ala Thr Pro Phe Asn Thr Ser Gln
65 70 75 80

Gln Glu Ile Leu Ser Asn Leu Gly Gly Ser Gln Met Gly Ile Gln Asp
85 90 95

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Phe Ser Ser Trp Arg Asp Ser Arg Asn Glu Met Leu Ala Asp Asn Val
            100                 105                 110

Phe Gln Val Ala Gln Asn Val Gln Gly Gln Gly Leu Ser Leu Ser Leu
        115                 120                 125

Gly Ser Asn Ile Pro Ser Gly Ile Gly Ile Ser His Val Gln Ser Gln
    130                 135                 140

Asn Pro Asn Gln Gly Gly Gly Phe Asn Met Ser Phe Gly Asp Gly Asp
145                 150                 155                 160

Asn Ser Gln Pro Lys Glu Gln Arg Asn Ala Asp Tyr Phe Pro Pro Asp
                165                 170                 175

Asn Pro Gly Arg Asp Leu Asp Ala Met Lys Gly Tyr Asn Ser Pro Tyr
            180                 185                 190

Gly Thr Ser Ser Ile Ala Arg Thr Ile Pro Ser Ser Lys Tyr Leu Lys
        195                 200                 205

Ala Ala Gln Tyr Leu Leu Asp Glu Val Val Ser Val Arg Lys Ala Ile
    210                 215                 220

Lys Glu Gln Asn Ser Lys Lys Glu Leu Thr Lys Asp Ser Arg Glu Ser
225                 230                 235                 240

Asp Val Asp Ser Lys Asn Ile Ser Ser Asp Thr Pro Ala Asn Gly Gly
                245                 250                 255

Ser Asn Pro His Glu Ser Lys Asn Asn Gln Ser Glu Leu Ser Pro Thr
            260                 265                 270

Glu Lys Gln Glu Val Gln Asn Lys Leu Ala Lys Leu Leu Ser Met Leu
        275                 280                 285

Asp Glu Ile Asp Arg Arg Tyr Arg Gln Tyr Tyr His Gln Met Gln Ile
    290                 295                 300

Val Val Ser Ser Phe Asp Val Val Ala Gly Glu Gly Ala Ala Lys Pro
305                 310                 315                 320

Tyr Thr Ala Leu Ala Leu Gln Thr Ile Ser Arg His Phe Arg Cys Leu
                325                 330                 335

Arg Asp Ala Ile Cys Asp Gln Ile Arg Ala Ser Arg Arg Ser Leu Gly
            340                 345                 350
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Glu Gln Asp Ala Ser Glu Asn Ser Lys Ala Ile Gly Ile Ser Arg Leu
        355                 360                 365

Arg Phe Val Asp His His Ile Arg Gln Gln Arg Ala Leu Gln Gln Leu
    370                 375                 380

Gly Met Met Gln Gln His Ala Trp Arg Pro Gln Arg Gly Leu Pro Glu
385                 390                 395                 400

Ser Ser Val Ser Val Leu Arg Ala Trp Leu Phe Glu His Phe Leu His
                405                 410                 415

Pro Tyr Pro Lys Asp Ser Asp Lys Ile Met Leu Ala Arg Gln Thr Gly
            420                 425                 430

Leu Thr Arg Ser Gln Val Ser Asn Trp Phe Ile Asn Ala Arg Val Arg
        435                 440                 445

Leu Trp Lys Pro Met Val Glu Glu Met Tyr Lys Glu Glu Ala Gly Asp
    450                 455                 460

Ala Lys Ile Asp Ser Asn Ser Ser Ser Asp Val Ala Pro Arg Leu Ala
465                 470                 475                 480

Thr Lys Asp Ser Lys Val Glu Glu Arg Gly Glu Leu His Gln Asn Ala
                485                 490                 495

Ala Ser Glu Phe Glu Gln Tyr Asn Ser Gly Gln Ile Leu Glu Ser Lys
            500                 505                 510

Ser Asn His Glu Ala Asp Val Glu Met Glu Gly Ala Ser Asn Ala Glu
        515                 520                 525

Thr Gln Ser Gln Ser Gly Met Glu Asn Gln Thr Gly Glu Pro Leu Pro
    530                 535                 540

Ala Met Asp Asn Cys Thr Leu Phe Gln Asp Ala Phe Val Gln Ser Asn
545                 550                 555                 560

Asp Arg Phe Ser Glu Phe Gly Ser Phe Gly Ser Gly Asn Val Leu Pro
                565                 570                 575

Asn Gly Val Ser Leu Thr Leu Gly Leu Gln Gln Gly Glu Gly Ser Asn
            580                 585                 590

Leu Pro Met Ser Ile Glu Thr His Val Ser Tyr Val Pro Leu Arg Ala
        595                 600                 605
```

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Asp Asp Met Tyr Ser Thr Ala Pro Thr Thr Met Val Pro Glu Thr Ala
    610                 615                 620

Glu Phe Asn Cys Leu Asp Ser Gly Asn Arg Gln Gln Pro Phe Trp Leu
625                 630                 635                 640

Leu Pro Ser Ala Thr
                645
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<210> 15
<211> 7
<212> PRT
<213> Solanum tuberosum

<400> 15
Val Ser Leu Thr Leu Gly Leu
  1   5

<210> 16
<211> 1383
<212> DNA
<213> Solanum tuberosum

<400> 16
gagtttctct ccctttaaa aaagaaaaaa aaaacacaac acccacttca aatatcaaac 60
aaatttctca tttgattatt tctaagtgat ttacactact ttgtattttt gtttgttttt 120
ttttagatat atatatggat gatgaaatgt atggttttca ttcaacaaga gacgattacg 180
cggataaagc tttgatgtca ccggagaatt tgatgatgca aactgagtac aacaatttcc 240
acaactatac caactcgtcc atcttgactt ctaatccgat gatgtttgga tccgatgata 300
ttcaattatc atcggaacaa actaattctt tcagtactat gactcttcaa aataatgata 360
atatttatca aattagaagt ggaaattgtg gcggaggcag tggcagtggt ggtagcagta 420
aggatcataa tgataataac aataataatg aagattatga tgaagatggt tcaaatgtta 480
tcaaggctaa aatcgtctca catccttatt atcctaaatt actcaacgct tatattgatt 540
gccaaaaggt tggagcacca gcgggtatag taaatctgct ggaagaaata aggcaacaaa 600
ctgattttcg taaaccaaac gctacttcta tatgtatagg agctgatcct gaacttgatg 660
agtttatgga aacgtattgt gatatattgt tgaagtataa gtccgatctg tctaggcctt 720
ttgatgaagc aacaacgttc ctcaacaaga ttgaaatgca actaggtaat ctttgcaaag 780
atgatggtgg tgtatcatca gatgaggagt taagttgtgg tgaggcagat gcatcaatga 840
gaagtgagga taatgaactc aaagatagac tcctacgtaa gtttggaagt catttaagta 900
gtctaaagtt ggaattttca aagaaaaaga agaaagggaa gctaccaaaa gaggcaaggc 960
aaatgttact tgcatggtgg gatgatcact ttagatggcc ttaccctacg gaggctgata 1020
agaattcact agcagaatca acaggacttg atccaaagca gatcaacaat tggtttataa 1080
atcaaaggaa gagacattgg aaaccatcag agaatatgca gttagctgtt atggataatc 1140
taagctctca gttcttctca tcagatgatt gagtttgaat ggaaattgtg aaaatactgc 1200
tcttcatttc tctttttatt atatataata tataaatagt atatttttgg gaaagaaaga 1260

agttatttta ttaatcaaaa tctctataaa taatggtaga gattaattaa tgttgaattc 1320
ttcttgatca tgtaaatatt caatctagct aattgtcaaa attaatgctt acctaaaaaa 1380
aaa 1383

<210> 17
<211> 345
<212> PRT
<213> Solanum tuberosum

<400> 17
Met Asp Asp Glu Met Tyr Gly Phe His Ser Thr Arg Asp Asp Tyr Ala
1 5 10 15

Asp Lys Ala Leu Met Ser Pro Glu Asn Leu Met Met Gln Thr Glu Tyr
20 25 30

Asn Asn Phe His Asn Tyr Thr Asn Ser Ser Ile Leu Thr Ser Asn Pro
35 40 45

Met Met Phe Gly Ser Asp Asp Ile Gln Leu Ser Ser Glu Gln Thr Asn
50 55 60

Ser Phe Ser Thr Met Thr Leu Gln Asn Asn Asp Asn Ile Tyr Gln Ile
65 70 75 80

Arg Ser Gly Asn Cys Gly Gly Gly Ser Gly Ser Gly Gly Ser Ser Lys
85 90 95

Asp His Asn Asp Asn Asn Asn Asn Asn Glu Asp Tyr Asp Glu Asp Gly
100 105 110

Ser Asn Val Ile Lys Ala Lys Ile Val Ser His Pro Tyr Tyr Pro Lys
115 120 125

Leu Leu Asn Ala Tyr Ile Asp Cys Gln Lys Val Gly Ala Pro Ala Gly
130 135 140

Ile Val Asn Leu Leu Glu Glu Ile Arg Gln Gln Thr Asp Phe Arg Lys
145 150 155 160

Pro Asn Ala Thr Ser Ile Cys Ile Gly Ala Asp Pro Glu Leu Asp Glu
165 170 175

Phe Met Glu Thr Tyr Cys Asp Ile Leu Leu Lys Tyr Lys Ser Asp Leu
180 185 190

Ser Arg Pro Phe Asp Glu Ala Thr Thr Phe Leu Asn Lys Ile Glu Met

195 200 205

Gln Leu Gly Asn Leu Cys Lys Asp Asp Gly Gly Val Ser Ser Asp Glu
210 215 220

Glu Leu Ser Cys Gly Glu Ala Asp Ala Ser Met Arg Ser Glu Asp Asn
225 230 235 240

Glu Leu Lys Asp Arg Leu Leu Arg Lys Phe Gly Ser His Leu Ser Ser
245 250 255

Leu Lys Leu Glu Phe Ser Lys Lys Lys Lys Lys Gly Lys Leu Pro Lys
260 265 270

Glu Ala Arg Gln Met Leu Leu Ala Trp Trp Asp Asp His Phe Arg Trp
275 280 285

Pro Tyr Pro Thr Glu Ala Asp Lys Asn Ser Leu Ala Glu Ser Thr Gly
290 295 300

Leu Asp Pro Lys Gln Ile Asn Asn Trp Phe Ile Asn Gln Arg Lys Arg
305 310 315 320

His Trp Lys Pro Ser Glu Asn Met Gln Leu Ala Val Met Asp Asn Leu
325 330 335

Ser Ser Gln Phe Phe Ser Ser Asp Asp
340 345

<210> 18
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 18
aagaagaaga agaaagggaa 20

<210> 19
<211> 17
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 19
atgaaccagt tgttgat 17

<210> 20
<211> 10
<212> DNA
<213> Solanum tuberosum

<400> 20
ttgacttgac 10

<210> 21
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 21
ggatccttga agtggctctt ctct 24

<210> 22
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 22
aatctagaga cactctcttt ttcgt 25

<210> 23
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 23

ctatttgact tcacacggtt attt 24

<210> 24
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 24
aaataaccgt gtgaagtcaa atag 24

<210> 25
<211> 8
<212> DNA
<213> Solanum tuberosum

<400> 25
tgacagst 8

<210> 26
<211> 9
<212> DNA
<213> Solanum tuberosum

<400> 26
tgacttgac 9

<210> 27
<211> 9
<212> DNA
<213> Solanum tuberosum

<400> 27
tgaswtgac 9

<210> 28
<211> 10
<212> DNA
<213> Solanum tuberosum

<400> 28

tgattgacag 10